CLAIMS

I claim:

1. A system for concrete surface repair comprising, in combination:

means to cut at least one broken concrete slab having a uniformly planar top surface into quarter sections without affecting existing concrete surfaces surrounding the broken slab;

means for removing at least one broken concrete slab in four lifts or less from a space bounded by unaffected surrounding concrete surfaces having a substantially uniform planar surface without impact to the underlying roadbed;

means for transporting at least one replacement concrete slab having a uniformly planar top surface and a longitudinal axis;

means for placing at least one replacement concrete slab having a uniformly planar top surface into position above the space bounded by unaffected surrounding concrete surfaces;

means for guiding at least one replacement concrete slab having a uniformly planar top surface into the space bounded by unaffected surrounding concrete surfaces;

means to inject fluid binding material between the roadbed and at least one replacement slab;

means to control replacement slab uplift during fluid

binding material injection; and

means to ensure planar uniformity between at least one replacement slab having a uniformly planar top surface and the planar surfaces of unaffected surrounding concrete surfaces.

2. The system of claim 1, wherein means to cut at least one broken concrete slab having a uniformly planar top surface into quarter sections without affecting existing concrete surfaces surrounding the broken slab comprises:

cutting means selected from the group consisting of at least one: circular saw means, jig saw means, laser saw means, and water jet saw means;

global positioning control means for controllably directing cutting action of each saw; and

microprocessor means for recording the global positioning coordinates of at least one cut slab before it is removed from a space bounded by unaffected surrounding concrete surfaces.

3. The system of claim 1, wherein means for removing at least one broken concrete slab in four lifts or less from a space bounded by the unaffected surrounding concrete surfaces without impact to the underlying roadbed comprises:

a plate of solid material comprising a predetermined geometry, uniform thickness, plate edge boundaries, a planar plate top surface and a planar plate bottom surface, wherein the plate can support weights up to

five tons;

a plurality of holes of uniform diameter through the plate, wherein each hole diameter defines a centerline perpendicular to the plate planar top and bottom surfaces;

a plurality of crane pick points on the plate edge boundaries;

means for anchoring the plate bottom planar surface flush to the top planar surface of at least one broken concrete slab quarter section through the plate holes; and

lifting crane mechanism means attached to selectively predetermined crane pick points.

4. The system of claim 3, wherein the plate further comprises:

a rectangular geometry having four corners;

a one-to-one ratio of holes to solid plate material; and

one crane pick point at each plate corner.

5. The system of claim 3, wherein the plate further comprises one or more crane pick points located on the plate top planar surface at predetermined positions interior from the plate edge boundaries.

6. The system of claim 3, wherein means for anchoring the plate bottom planar surface flush to the top planar surface of at least one broken concrete slab quarter section further comprises at least one expanding deadbolt threaded receiver positioned through at least one predetermined plate hole into the slab quarter section and at least one corresponding

threaded bolt insertably positioned through each predetermined hole and received by the expanding deadbolt threaded receiver.

7. The system of claim 3, wherein the plate solid material is selected from the group consisting of metal, high strength poly-carbon, and other suitable materials thick and strong enough to support weights of approximately 5 tons.

8. The system of claim 1, wherein means for transporting at least one replacement concrete slab comprises, in combination:

a frame capable of supporting replacement concrete slabs weighing approximately 25,000 pounds and having a longitudinal frame axis, comprising a front frame member having a top portion and bottom portion, a rear frame member having a top portion and a bottom portion, and a main support beam member connecting the front frame member and rear frame member by attachment to the top frame member portions, wherein the support beam comprises a top surface, a bottom surface, and two side surfaces;

wheel mounting members pivotally joined to the front frame member bottom portion;

wheel mounting members fixedly joined to the rear frame member bottom portion;

a tongue projecting forward from and joined to the wheel mounting members connected to the front frame member

bottom portion;

wheels rotatably disposed on the wheel mounting members; and

means to rotate, lower and raise, and fixedly secure at least one replacement concrete slab within the frame.

9. The system of claim 8, wherein means to rotate, lower and raise, and fixedly secure at least one replacement concrete slab having a uniformly planar top surface within the frame further comprises, in combination:

at least four hoist chains, each chain having two ends;

mechanical hoist linkage means joined to the main support beam and interconnecting the main support beam and one end of each hoist chain, wherein at least two hoist chains are oppositely opposed on either side of the main support beam, and wherein mechanical hoist linkage means provides separate controlled movement of each chain;

at least one attachment pick point attached to each chain end not affixed to mechanical hoist linkage means, wherein at least four attachment pick points are axially aligned on the replacement concrete slab planar top surface perpendicular to the replacement slab longitudinal axis such that engagement of mechanical hoist linkage means controllably rotates the replacement concrete slab planar top surface from a substantially horizontal position about its longitudinal axis, whereby the rotated replacement

concrete slab fits within the frame width; and

at least four removable swing stabilizer bars insertably positioned into the frame members as corresponding pairs between the wheel mounting members and the main support beam member once the replacement concrete slab has been fully rotated, wherein the inserted stabilizer bars project rearwards perpendicularly from the front frame member and the inserted stabilizer bars project forward perpendicularly from the rear frame member, and wherein the rotated replacement slab fits between corresponding inserted stabilizer bar pairs during transport of the replacement slab;

wherein the main support beam member is fixedly attached to the top frame member portions; and

wherein the frame height is approximately twelve feet, the frame length is approximately twenty-six feet, and the frame width is approximately seven and one half feet.

10. The system of claim 8, wherein means to rotate, lower and raise, and fixedly secure at least one replacement concrete slab having a uniformly planar top surface within the frame further comprises, in combination:

at least one carrier plate of solid material comprising a predetermined geometry, substantially uniform thickness, plate edge boundaries, a planar plate top surface, a planar plate bottom surface, and a

longitudinal axis;

means to controllably raise or lower each carrier plate within the frame;

means to controllably rotate each carrier plate along its longitudinal axis within the frame;

attachment means whereby each carrier plate bottom surface is anchored flush to at least one replacement slab planar top surface; and

means to controllably adjust frame member main support beam height.

11. The system of claim 10, wherein means to controllably rotate each carrier plate along its longitudinal axis within the frame comprises:

at least three pairs of ram drive means positioned along the main support beam member at predetermined locations, wherein each pair of drive means is fixedly located on opposite side surfaces of the main support beam member, wherein one of each pair of drives on the same main support beam member side surface controllably operates only vertically relative to the frame, and the corresponding drive on the opposite support beam side controllably operates in a vertical plane relative to the frame;

at least six hydraulic arm means, each arm means comprising two ends, wherein one arm means end is

joined to and controlled by separate ram drive means and the other arm means end is pivotally joined to the carrier plate; and

at least three rigid support bars, each bar comprising two ends, wherein one bar end is pivotally joined to hydraulic arm means operating only in a vertical direction by a rotating ram drive means and the other bar end is pivotally joined to the carrier main support member.

12. The system of claim 10, wherein means to controllably raise or lower each carrier plate within the frame comprises a horizontal cross member fixedly joined to the top portion of each frame member, wherein the main support beam member is fixedly joined to each frame member by attachment to the cross members, and wherein means to controllably adjust frame main support beam member height comprises mechanism means in the front frame member and the rear frame member selected from the group consisting of at least one: vertical worm screw means, rope and pulley means, and cable and pulley means.

13. The system of claim 10, wherein means to controllably raise or lower each carrier plate within the frame comprises a horizontal cross member hinged to the top portion of each frame member, wherein the frame main support beam is hinged to each frame member by attachment to the cross members, and wherein means to controllably adjust frame main support beam

member height comprise pivot means whereby each frame member bottom portion to extends independently outward from the carrier plate horizontally along the frame longitudinal axis.

14. The system of claim 8, wherein means for placing at least one replacement concrete slab having a uniformly planar top surface into position above the space bounded by unaffected surrounding concrete surfaces comprises at least one guide ramp assembly comprising:

an approach lip with a beveled end and a hinged end wherein the angle of the ramp relative to surrounding concrete surfaces is adjustable;

a pair of ramps, each ramp having a channel, an outside edge, and inside edge, a ramp top, and a ramp bottom defining a predetermined uniform angle of declination from surrounding concrete surfaces, wherein the ramps are fixedly attached at a predetermined distance by at least two uniform cross members affixed to the ramp inside edges, wherein the ramps are aligned within the space bounded by unaffected surrounding concrete surfaces by manual adjustment means affixed to the ramp outside edges, and wherein the ramp channels and cross members are sized to receive replacement slab transporting means wheel dimensions;

at least one steel pad; and

an approach support member having a first hinged end

attached to the approach lip hinged end and a second hinged end attached to the ramp tops, a top side, and a bottom side, wherein the support member height is adjusted by placing at least one steel pad between the support member bottom side and unaffected concrete top planar surface.

15. The system of claim 10, wherein means for guiding at least one replacement concrete slab having a uniformly planar top surface into the space bounded by unaffected surrounding concrete surfaces comprises:

at least one replacement concrete slab comprising a planar top surface of rectangular geometry defining slab side boundary edges, four corners, a predetermined uniform thickness, a predetermined length dimension, a predetermined width dimension, and means to identify the replacement slab with respect to placement of the replacement slab within a previously identified space in an existing concrete surface;

a plurality of adjustable and detachable slab collar members surrounding the slab side boundary edges;

adjustable and detachable slab collar members surrounding the slab corners;

rectangular carrier plate geometry comprising, four corners, a predetermined uniform thickness, a predetermined length dimension which is slightly longer than the length of the replacement slab, and a predetermined

width dimension which is slightly shorter than the width of the replacement slab;

means to fixedly attach adjustable and detachable slab collar members surrounding the slab side boundary edges to the carrier plate;

means to fixedly attach adjustable and detachable slab collar members surrounding the slab corners to the means to fixedly attach adjustable and detachable slab collar members surrounding the slab side boundary edges to the carrier plate; and

global satellite positioning control means to position the carrier plate.

16. The system of claim 15, wherein means to fixedly attach adjustable and detachable slab collar members surrounding the slab side boundary edges to the carrier plate comprises:

four uniform collars each comprising a top surface of predetermined width having a longitudinal axis, inside and outside surfaces of predetermined height which end at a tapered squared-off collar bottom, a cross-sectional geometry defining a vertical side attached at right angles to the top and bottom sides which join a tapered side, a plurality of extension arms equidistantly spaced along the collar inside surfaces extending inwards from the surfaces perpendicular to the collar longitudinal axis, wherein two longer collars have uniform lengths slightly shorter than

corresponding replacement slab length dimension, and wherein the other two shorter collars have uniform lengths slightly shorter than corresponding replacement slab width dimension;

two uniform slot bars fixedly attached to the carrier plate top side, parallel to the carrier plate long side, and comprising a plurality of slots sized to receive and hold collar extension arms so that the longer collar inside surfaces communicate with the replacement slab length boundaries, wherein one slot bar is set at a predetermined distance from one carrier plate long side and the other slot bar is set at an equal distance from the other carrier plate long side;

two uniform sets of a plurality of slots in carrier plate short sides, wherein each slot has uniform cross-sectional geometries defining a slot centerline, wherein each set of slots comprises the same number of slots on each carrier plate short side, wherein slot center-lines are perpendicular to the carrier plate short side, wherein the alignment of slot center-lines on the carrier plate short side are equidistant and linear, and wherein the slots are sized to receive and hold collar extension arms so that the shorter collar inside surfaces communicate with the replacement slab width boundaries.

17. The system of claim 16, wherein means to inject fluid

binding material between the roadbed and at least one replacement slab comprises:

replacement slab with a bottom surface comprising precast flow channels, at least one injection port on the slab top surface through the slab thickness and exiting on the slab bottom surface within a flow channel; and

four corner collars bridging the space between shorter and longer collars on the replacement plate corners.

18. The system of claim 17, wherein means to inject fluid binding material between the roadbed and at least one replacement slab further comprises at least one injection port in a replacement slab collar member.

19. The system of claim 18, wherein means to identify the replacement slab with respect to placement of the replacement slab within a previously identified space in an existing concrete surface comprises:

bar code identification of at least one replacement slab stored in means for microprocessor data storage and access;

correlation of bar code identification for at least one replacement slab with global satellite positioning coordinates for the broken concrete slab removed from a space bounded by unaffected surrounding concrete surfaces by microprocessor means; and

wireless transmission means to communicate a plurality of data selected from the group consisting of at least:

bar code identification for at least one replacement slab and global satellite positioning coordinates for positioning the replacement slab into the space vacated by the removed broken concrete slab, to means for guiding at least one replacement concrete slab into the space bounded by unaffected surrounding concrete surfaces.

20. The system of claim 10, wherein means to control replacement slab uplift during fluid binding material injection and means to ensure planar uniformity between at least one replacement slab and the unaffected surrounding concrete surfaces comprises:

at least one bridge plate of solid material comprising a predetermined geometry, uniform thickness, a planar plate top surface, a planar plate bottom surface, and a plurality of slots through the bridge plate, wherein the bridge plate bottom surface can be fixedly attached to a replacement slab top surface positioned in the space bounded by unaffected surrounding concrete surfaces with a portion of the bridge plate planer bottom surface extending to and communicating with unaffected surrounding concrete surfaces;

attachment means whereby at least one bridge plate bottom surface can be fixedly attached to a replacement slab top surface positioned in the space bounded by unaffected surrounding concrete surfaces through the

slots through the bridge plate; and

at least one support weight affixed to the bridge plate top surface corresponding to the bridge plate planer bottom surface extending to and communicating with unaffected surrounding concrete surfaces.

21. The system of claim 10, wherein means to control replacement slab uplift during fluid binding material injection and means to ensure planar uniformity between at least one replacement slab and the unaffected surrounding concrete surfaces comprises:

at least one cross collar assembly comprising a solid central body, a plurality of slots through the central body, at least four pair of equal sized, extendable bridge forks, wherein one pair of bridge forks extend from the collar central body in ninety degree orientation to adjacent bridge fork pairs such that the collar provides bridge fork extension over a 360 degree range in ninety degree increments, and wherein extending bridge fork ends further comprise a plate element which rests on top of unaffected surrounding concrete surfaces when the bridge forks are extended;

means for counter balancing weighted mass on the plate element of each extending bridge fork; and

attachment means whereby at least one cross collar assembly is fixedly joined to a replacement slab top surface positioned in the space bounded by unaffected

surrounding concrete surfaces through the slots through the cross collar.

22. The system of claim 12, wherein means to control replacement slab uplift during fluid binding material injection and means to ensure planar uniformity between at least one replacement slab and the unaffected surrounding concrete surfaces comprise adjusting front and rear frame members heights until all wheels are off the ground, wherein the entire frame weight is transferred to the replacement slab top surface, and wherein the carrier plate extends to unaffected surrounding concrete surfaces.

23. The system of claim 13, wherein means to control replacement slab uplift during fluid binding material injection and means to ensure planar uniformity between at least one replacement slab and the unaffected surrounding concrete surfaces comprise front and rear frame members extending outward from the replacement slab, wherein substantially all of the frame weight is transferred to the replacement slab top surface, and wherein the carrier plate extends to unaffected surrounding concrete surfaces.

24. The system of claim 10, wherein attachment means between the carrier plate and replacement slab further comprises:

a plurality of rectangular slots through the plate surface wherein each slot has a predetermined length and width dimension;

at least one expanding deadbolt threaded receiver positioned

through at least one predetermined plate slot into the slab quarter section and at least one corresponding threaded bolt having a head insertably positioned through each predetermined hole and received by the expanding deadbolt threaded receiver wherein the bolt head diameter is larger than the corresponding slot width.

25. The system of claim 11, wherein means to controllably rotate each carrier plate along its longitudinal axis within the frame further comprises a heim joint located at ram drive means connected to the main support beam, and each hydraulic arm means has a heim joint at the carrier plate connection.

26. Apparatus for cutting at least one broken concrete slab having a uniformly planar top surface into a plurality of sections without affecting existing planar concrete surfaces surrounding the broken concrete slab comprising:

cutting means selected from the group consisting of at least one: circular saw means, jig saw means, laser saw means, and water jet saw means;

global positioning control means for controllably directing cutting action of each saw; and

microprocessor means for recording the global positioning coordinates of at least one cut slab before it is removed from a space bounded by unaffected surrounding concrete surfaces.

27. Apparatus for removing at least one segment of broken

concrete slab cut according to the apparatus of claim 26 from a space bounded by unaffected surrounding concrete surfaces without impact to the underlying roadbed comprising:

a plate of solid material comprising a predetermined geometry, uniform thickness, plate edge boundaries, a planar plate top surface and a planar plate bottom surface, wherein the plate can support weights up to five tons;

a plurality of attachment means anchoring the planar plate bottom surface flush to the planar top surface of at least one segment of cut broken concrete slab;

a plurality of holes of uniform diameters through the plate, wherein each hole diameter defines a centerline perpendicular to the plate planar top and bottom surfaces;

a plurality of crane pick points on the plate edge boundaries; and

lifting crane mechanism means attached to selectively predetermined crane pick points.

28. The plate apparatus of claim 27, further comprising:

rectangular plate geometry having four corners;

a one-to-one ratio of holes to solid plate material; and

one crane pick point at each plate corner.

29. The plate apparatus of claim 27, further comprising one or more crane pick points located on the plate top planar

surface at predetermined positions interior from the plate edge boundaries.

30. The plate apparatus of claim 27, wherein attachment means for anchoring the plate bottom planar surface flush to the top planar surface of at least one broken concrete slab quarter section further comprises at least one expanding deadbolt threaded receiver positioned through at least one predetermined plate hole into the slab quarter section and at least one corresponding threaded deadbolt insertably positioned through each predetermined hole and received by the expanding deadbolt threaded receiver.

31. The plate apparatus of claim 27, wherein the plate solid material is selected form the group consisting of metal, high strength poly-carbon, and other suitable materials thick and strong enough to support weights of approximately 5 tons.

32. Apparatus for transporting at least one replacement concrete slab having a uniformly planar top surface and a longitudinal axis to the space created by the apparatus of claim 27 and bounded by unaffected surrounding concrete surfaces without impact to the underlying roadbed comprising:

a frame capable of supporting replacement concrete slabs weighing approximately 25,000 pounds and having a longitudinal frame axis, comprising a front frame member having a top portion and bottom portion, a rear

frame member having a top portion and a bottom portion, and a main support beam member connecting the front frame member and rear frame member by attachment to the top frame member portions, wherein the support beam comprises a top surface, a bottom surface, and two side surfaces;

wheel mounting members pivotally joined to the front frame member bottom portion;

wheel mounting members fixedly joined to the rear frame member bottom portion;

a tongue projecting forward from and joined to the wheel mounting members connected to the front frame member bottom portion;

wheels rotatably disposed on the wheel mounting members;

means to fixedly secure at least one replacement concrete slab within the frame; and

means for placing at least one replacement concrete slab having a uniformly planar top surface into position above the space bounded by unaffected surrounding concrete surfaces.

33. The transport apparatus of claim 32, wherein means to fixedly secure at least one replacement concrete slab having a uniformly planar top surface within the frame comprises:

at least four hoist chains, each chain having two ends;

mechanical hoist linkage means joined to the main support beam and interconnecting the main support beam and one

end of each hoist chain, wherein at least two hoist chains are oppositely opposed on either side of the main support beam, and wherein mechanical hoist linkage means provides separate controlled movement of each chain;

at least one attachment pick point attached to each chain end not affixed to mechanical hoist linkage means, wherein at least four attachment pick points are axially aligned on the replacement concrete slab planar top surface perpendicular to the replacement slab longitudinal axis such that engagement of mechanical hoist linkage means controllably rotates the replacement concrete slab planar top surface from a substantially horizontal position about its longitudinal axis, whereby the rotated replacement concrete slab fits within the frame width;

at least four removable swing stabilizer bars insertably positioned into the frame members as corresponding pairs between the wheel mounting members and the main support beam member once the replacement concrete slab has been fully rotated, wherein the inserted stabilizer bars project rearwards perpendicularly from the front frame member and the inserted stabilizer bars project forward perpendicularly from the rear frame member;

wherein the rotated replacement slab fits between corresponding inserted stabilizer bar pairs during

transport of the replacement slab;

wherein the main support beam member is fixedly attached to the top frame member portions; and

wherein the frame height is approximately twelve feet, the frame length is approximately twenty-six feet, and the frame width is approximately seven and one half feet.

34. The transport apparatus of claim 32, wherein means to fixedly secure at least one replacement concrete slab having a uniformly planar top surface within the frame comprises:

at least one carrier plate of solid material comprising a predetermined geometry, substantially uniform thickness, plate edge boundaries, a planar plate top surface, a planar plate bottom surface, and a longitudinal axis;

means to controllably raise or lower each carrier plate within the frame;

means to controllably rotate each carrier plate along its longitudinal axis within the frame;

attachment means whereby each carrier plate bottom surface is anchored flush to at least one replacement slab planar top surface;

means to controllably adjust frame main support beam member height;

means to control replacement slab uplift during fluid binding material injection; and

means to ensure planar uniformity between at least one

replacement slab and the unaffected surrounding concrete surfaces.

35. The transport apparatus of claim 32, wherein means to controllably rotate each carrier plate along its longitudinal axis within the frame comprises:

at least three pairs of ram drive means positioned along the main support beam member at predetermined locations, wherein each pair of drive means is fixedly located on opposite side surfaces of the main support beam member, wherein one of each pair of drives on the same main support beam member side surface controllably operates only vertically relative to the frame, and the corresponding drive on the opposite support beam side controllably operates in a vertical plane relative to the frame;

at least six hydraulic arms, each arm comprising two ends, wherein one arm end is joined to and controlled by separate ram drive means and the other arm end is pivotally joined to the carrier plate; and

at least three rigid support bars, each bar comprising two ends, wherein one bar end is pivotally joined to a hydraulic arm operating only in a vertical direction by a rotating ram drive means and the other bar end is pivotally joined to the carrier main support member.

36. The transport apparatus of claim 34, further comprising a horizontal cross member fixedly joined to the top portion of each frame member, wherein the main support beam member is fixedly joined to each frame member by attachment to the cross members, and wherein means to controllably adjust frame main support beam member height comprise mechanism means in the front frame member and the rear frame member selected from the group consisting of at least one: vertical worm screw means, rope and pulley means, and cable and pulley means.

37. The transport apparatus of claim 34, further comprising a horizontal cross member hinged to the top portion of each frame member, wherein the frame main support beam is hinged to each frame member by attachment to the cross members, and wherein means to controllably adjust frame main support beam member height comprise pivot means whereby each frame member bottom portion to extends independently outward from the carrier plate horizontally along the frame longitudinal axis.

38. The transport apparatus of claim 34, wherein means for placing at least one replacement concrete slab having a uniformly planar top surface into position above the space bounded by unaffected surrounding concrete surfaces comprises:

an approach lip with a beveled end and a hinged end wherein the angle of the lip relative to surrounding concrete

surfaces is adjustable;

a pair of ramps, each ramp having a channel, an outside edge, and inside edge, a ramp top, and a ramp bottom defining a predetermined uniform angle of declination from surrounding concrete surfaces, wherein the ramps are fixedly attached at a predetermined distance by at least two uniform cross members affixed to the ramp inside edges, wherein the ramps are aligned within the space bounded by unaffected surrounding concrete surfaces by manual adjustment means affixed to the ramp outside edges, and wherein the ramp channels and cross members are sized to receive replacement slab transporting means wheel dimensions;

at least one steel pad; and

an approach support member having a first hinged end attached to the approach lip hinged end and a second hinged end attached to the ramp tops, a top side, and a bottom side, wherein the support member height is adjusted by placing at least one steel pad between the support member bottom side and unaffected concrete top planar surface.

39. The transport apparatus of claim 32, wherein means for placing at least one replacement concrete slab having a uniformly planar top surface into position above the space bounded by unaffected surrounding concrete surfaces comprises:

at least one replacement concrete slab comprising rectangular geometry defining slab side boundary edges, four corners, a predetermined uniform thickness, a predetermined length dimension, a predetermined width dimension, and means to identify the replacement slab with respect to placement of the replacement slab within a previously identified space in an existing concrete surface;

adjustable and detachable slab collar members surrounding the slab side boundary edges;

adjustable and detachable slab collar members surrounding the slab corners;

rectangular carrier plate geometry comprising, four corners, a predetermined uniform thickness, a predetermined length dimension which is slightly longer than the length of the replacement slab, and a predetermined width dimension which is slightly shorter than the width of the replacement slab;

means to fixedly attach adjustable and detachable slab collar members surrounding the slab side boundary edges to the carrier plate;

means to fixedly attach adjustable and detachable slab collar members surrounding the slab corners to the means to fixedly attach adjustable and detachable slab collar members surrounding the slab side boundary edges to the carrier plate; and

global satellite positioning control means to position the carrier plate.

40. The slab positioning apparatus of claim 39, wherein means to fixedly attach adjustable and detachable slab collar members surrounding the slab side boundary edges to the carrier plate comprises:

four uniform collars each comprising a top surface of predetermined width having a longitudinal axis, inside and outside surfaces of predetermined height which end at a tapered collar bottom, a cross-sectional geometry defining a vertical side attached at right angles to the top and bottom sides which join a tapered side, a plurality of extension arms equidistantly spaced along the collar inside surfaces extending inwards from the surfaces perpendicular to the collar longitudinal axis, wherein two longer collars have uniform lengths slightly shorter than corresponding replacement slab length dimension, and wherein the other two shorter collars have uniform lengths slightly shorter than corresponding replacement slab width dimension;

two uniform slot bars fixedly attached to the carrier plate top side, parallel to the carrier plate long side, and comprising a plurality of slots sized to receive and hold collar extension arms so that the longer collar inside surfaces communicate with the replacement slab length boundaries, wherein one slot bar is set at a

predetermined distance from one carrier plate long side and the other slot bar is set at an equal distance from the other carrier plate long side;

two uniform sets of a plurality of slots in carrier plate short sides, wherein each slot has uniform cross-sectional geometries defining a slot centerline, wherein each set of slots comprises the same number of slots on each carrier plate short side, wherein slot center-lines are perpendicular to the carrier plate short side, wherein the alignment of slot center-lines on the carrier plate short side are equidistant and linear, and wherein the slots are sized to receive and hold collar extension arms so that the shorter collar inside surfaces communicate with the replacement slab width boundaries.

41. The apparatus of claim 40, further comprising:

at lest one replacement slab with a substantially uniform slab thickness, a top surface, a bottom surface comprising precast flow channels, at least one injection port on the replacement slab top surface through the slab thickness and exiting on the slab bottom surface within a flow channel; and

four corner collars bridging the space between shorter and longer collars on the replacement plate corners.

42. The apparatus of claim 41, further comprising at least one injection port in a replacement slab collar member.

43. The apparatus of claim 42, further comprising:

bar code identification of at least one replacement slab stored in means for microprocessor data storage and access;

correlation of bar code identification for at least one replacement slab with global satellite positioning coordinates for the broken concrete slab removed from a space bounded by unaffected surrounding concrete surfaces by microprocessor means; and

wireless transmission means to communicate a plurality of data selected from the group consisting of at least: bar code identification for at least one replacement slab and global satellite positioning coordinates for positioning the replacement slab into the space vacated by the removed broken concrete slab, to means for guiding at least one replacement concrete slab into the space bounded by unaffected surrounding concrete surfaces.

44. The apparatus of claim 34, wherein means to control replacement slab uplift during fluid binding material injection and means to ensure planar uniformity between at least one replacement slab and the unaffected surrounding concrete surfaces comprises:

at least one bridge plate of solid material comprising a predetermined geometry, uniform thickness, a planar plate top surface, a planar plate bottom surface, and a

plurality of slots through the bridge plate, wherein the bridge plate bottom surface can be fixedly attached to a replacement slab top surface positioned in the space bounded by unaffected surrounding concrete surfaces with a portion of the bridge plate planer bottom surface extending to and communicating with unaffected surrounding concrete surfaces;

attachment means whereby at least one bridge plate bottom surface can be fixedly attached to a replacement slab top surface positioned in the space bounded by unaffected surrounding concrete surfaces through the slots through the bridge plate; and

at least one support weight affixed to the bridge plate top surface corresponding to the bridge plate planer bottom surface extending to and communicating with unaffected surrounding concrete surfaces.

45. The transport apparatus of claim 34, wherein means to control replacement slab uplift during fluid binding material injection and means to ensure planar uniformity between at least one replacement slab and the unaffected surrounding concrete surfaces comprises:

at least one cross collar assembly comprising a solid central body, a plurality of slots through the central body, at least four pair of equal sized, extendable bridge forks, wherein one pair of bridge forks extend from the collar central body in ninety degree

orientation to adjacent bridge fork pairs such that the collar provides bridge fork extension over a 360 degree range in ninety degree increments, and wherein extending bridge fork ends further comprise a plate element which rests on top of unaffected surrounding concrete surfaces when the bridge forks are extended;

means for counter balancing weighted mass on the plate element of each extending bridge fork; and

attachment means whereby at least one cross collar assembly is fixedly joined to a replacement slab top surface positioned in the space bounded by unaffected surrounding concrete surfaces through the slots through the cross collar.

46. The transport apparatus of claim 36, wherein means to control replacement slab uplift during fluid binding material injection and means to ensure planar uniformity between at least one replacement slab and the unaffected surrounding concrete surfaces comprise adjusting front and rear frame members heights until all wheels are off the ground, wherein the entire frame weight is transferred to the replacement slab top surface, and wherein the carrier plate extends to unaffected surrounding concrete surfaces.

47. The apparatus of claim 37, wherein means to control replacement slab uplift during fluid binding material injection and means to ensure planar uniformity between at least one replacement slab and the unaffected surrounding

concrete surfaces comprise front and rear frame members extending outward from the replacement slab, wherein substantially all of the frame weight is transferred to the replacement slab top surface, and wherein the carrier plate extends to unaffected surrounding concrete surfaces.

48. The apparatus of claim 34, wherein attachment means between the carrier plate and replacement slab further comprises:

a plurality of rectangular slots through the plate surface wherein each slot has a predetermined length and width dimension;

at least one expanding deadbolt threaded receiver positioned through at least one predetermined plate slot into the slab quarter section and at least one corresponding threaded bolt having a head insertably positioned through each predetermined hole and received by the expanding deadbolt threaded receiver wherein the bolt head diameter is larger than the corresponding slot width.

49. The apparatus of claim 35, wherein each ram drive means further comprises a heim joint located at ram drive means connected to the main support beam, and each hydraulic arm means has a heim joint at the carrier plate connection.

50. A method of concrete highway surface repair, the method comprising the steps of:

providing the system of claim 1;

providing a highway surface with at least one failed or

broken concrete slab;

identifying at least one broken concrete slab in the highway surface;

cutting at least one broken concrete slab into quarter sections without affecting the existing concrete surfaces surrounding the broken slab;

removing at least one broken concrete slab in four lifts or less from a space bounded by unaffected surrounding concrete surfaces;

transporting at least one replacement concrete slab having a uniformly planar top surface and a longitudinal axis to the space bounded by unaffected surrounding concrete surfaces;

placing at least one replacement concrete slab having a uniformly planar top surface into position above the space bounded by unaffected surrounding concrete surfaces;

guiding at least one replacement concrete slab having a uniformly planar top surface into the space bounded by unaffected surrounding concrete surfaces;

injecting fluid binding material between the roadbed and at least one replacement slab;

controlling replacement slab uplift during fluid binding material injection; and

ensuring planar uniformity between at least one replacement slab uniformly planar top surface and the planar

surfaces of unaffected surrounding concrete surfaces.

51. A method of cutting at least one broken concrete slab into quarter sections without affecting the existing concrete surfaces surrounding the broken slab according to claim 50 including:

providing cutting means selected from the group consisting of at least one: circular saw means, laser saw means, and water jet saw means;

providing global positioning control means for controllably directing cutting action of each saw; and

providing microprocessor means for recording the global positioning coordinates of at least one cut slab before it is removed from a space bounded by unaffected surrounding concrete surfaces.

52. The method of removing at least one broken concrete slab in four lifts or less according to claim 50 including:

providing a plate of solid material comprising a predetermined geometry, uniform thickness, plate edge boundaries, a planar plate top surface and a planar plate bottom surface, wherein the plate can support weights up to five tons;

providing a plurality of holes of uniform diameter through the plate, wherein each hole diameter defines a centerline perpendicular to the plate planar top and bottom surfaces;

providing a plurality of crane pick points on the plate edge

boundaries;

providing means for anchoring the plate bottom planar surface flush to the top planar surface of at least one broken concrete slab quarter section through the plate holes;

providing crane lifting means joined to crane pick points.

53. The method of transporting at least one replacement concrete slab having a uniformly planar top surface and a longitudinal axis to the space bounded by unaffected surrounding concrete surfaces according to claim 52 including:

providing a frame capable of supporting replacement concrete slabs weighing approximately 25,000 pounds and having a longitudinal frame axis, comprising a front frame member having a top portion and bottom portion, a rear frame member having a top portion and a bottom portion, and a main support beam member connecting the front frame member and rear frame member by attachment to the top frame member portions, wherein the support beam comprises a top surface, a bottom surface, and two side surfaces;

providing wheel mounting members pivotally joined to the front frame member bottom portion;

providing wheel mounting members fixedly joined to the rear frame member bottom portion;

providing a tongue projecting forward from and joined to the

wheel mounting members connected to the front frame member bottom portion;

providing wheels rotatably disposed on the wheel mounting members; and

providing means to rotate, lower and raise, and fixedly secure at least one replacement concrete slab within the frame.

54. The method of placing at least one replacement concrete slab having a uniformly planar top surface into position above the space bounded by unaffected surrounding concrete surfaces according to claim 53 including:

providing at least one replacement concrete slab comprising a planar top surface of rectangular geometry defining slab side boundary edges, four corners, a predetermined uniform thickness, a predetermined length dimension, a predetermined width dimension, and means to identify the replacement slab with respect to placement of the replacement slab within existing concrete surface;

providing a plurality of adjustable and detachable slab collar members surrounding the slab side boundary edges wherein each collar member further comprises at least one injection port;

providing adjustable and detachable slab collar members surrounding the slab corners;

providing rectangular carrier plate geometry comprising, four corners, a predetermined uniform thickness, a

predetermined length dimension which is slightly longer than the length of the replacement slab, and a predetermined width dimension which is slightly shorter than the width of the replacement slab;

providing means to fixedly attach adjustable and detachable slab collar members surrounding the slab side boundary edges to the carrier plate;

providing means to fixedly attach adjustable and detachable slab collar members surrounding the slab corners to the means to fixedly attach adjustable and detachable slab collar members surrounding the slab side boundary edges to the carrier plate; and

providing global satellite positioning control means to position the carrier plate.

55. The method of guiding at least one replacement concrete slab having a uniformly planar top surface into the space bounded by unaffected surrounding concrete surfaces according to claim 54 including:

providing four uniform collars each comprising a top surface of predetermined width having a longitudinal axis, inside and outside surfaces of predetermined height which end at a tapered squared-off collar bottom, a cross-sectional geometry defining a vertical side attached at right angles to the top and bottom sides which join a tapered side, a plurality of extension arms equidistantly spaced along the collar inside

surfaces extending inwards from the surfaces perpendicular to the collar longitudinal axis, wherein two longer collars have uniform lengths slightly shorter than corresponding replacement slab length dimension, and wherein the other two shorter collars have uniform lengths slightly shorter than corresponding replacement slab width dimension;

providing two uniform slot bars fixedly attached to the carrier plate top side, parallel to the carrier plate long side, and comprising a plurality of slots sized to receive and hold collar extension arms so that the longer collar inside surfaces communicate with the replacement slab length boundaries, wherein one slot bar is set at a predetermined distance from one carrier plate long side and the other slot bar is set at an equal distance from the other carrier plate long side;

providing two uniform sets of a plurality of slots in carrier plate short sides, wherein each slot has uniform cross-sectional geometries defining a slot centerline, wherein each set of slots comprises the same number of slots on each carrier plate short side, wherein slot center-lines are perpendicular to the carrier plate short side, wherein the alignment of slot center-lines on the carrier plate short side are equidistant and linear, and wherein the slots are sized to receive and hold collar extension arms so that the

shorter collar inside surfaces communicate with the replacement slab width boundaries;

providing means for bar code identification of at least one replacement slab stored in means for microprocessor data storage and access;

providing means for correlation of bar code identification for at least one replacement slab with global satellite positioning coordinates for the broken concrete slab removed from a space bounded by unaffected surrounding concrete surfaces by microprocessor means; and

providing wireless transmission means to communicate a plurality of data selected from the group consisting of at least: bar code identification for at least one replacement slab and global satellite positioning coordinates for positioning the replacement slab into the space vacated by the removed broken concrete slab, to means for guiding at least one replacement concrete slab into the space bounded by unaffected surrounding concrete surfaces.

56. The method of injecting fluid binding material between the roadbed and at least one replacement slab according to claim 55 including:

providing at least one replacement slab with a bottom surface comprising precast flow channels, at least one injection port on the slab top surface through the slab thickness and exiting on the slab bottom surface within

a flow channel;

providing four corner collars bridging the space between shorter and longer collars on the replacement plate corners; and

providing at least one injection port in a replacement slab collar member.

57. The method of controlling replacement slab uplift during fluid binding material injection and ensuring planar uniformity between at least one replacement slab uniformly planar top surface and the planar surfaces of unaffected surrounding concrete surfaces according to claim 56 including:

providing at least one bridge plate of solid material comprising a predetermined geometry, uniform thickness, a planar plate top surface, a planar plate bottom surface, and a plurality of slots through the bridge plate, wherein the bridge plate bottom surface can be fixedly attached to a replacement slab top surface positioned in the space bounded by unaffected surrounding concrete surfaces with a portion of the bridge plate planer bottom surface extending to and communicating with unaffected surrounding concrete surfaces;

providing attachment means whereby at least one bridge plate bottom surface can be fixedly attached to a replacement slab top surface positioned in the space bounded by

unaffected surrounding concrete surfaces through the slots through the bridge plate; and

providing at least one support weight affixed to the bridge plate top surface corresponding to the bridge plate planer bottom surface extending to and communicating with unaffected surrounding concrete surfaces.